

FIG. 1A

Light diffraction on grating

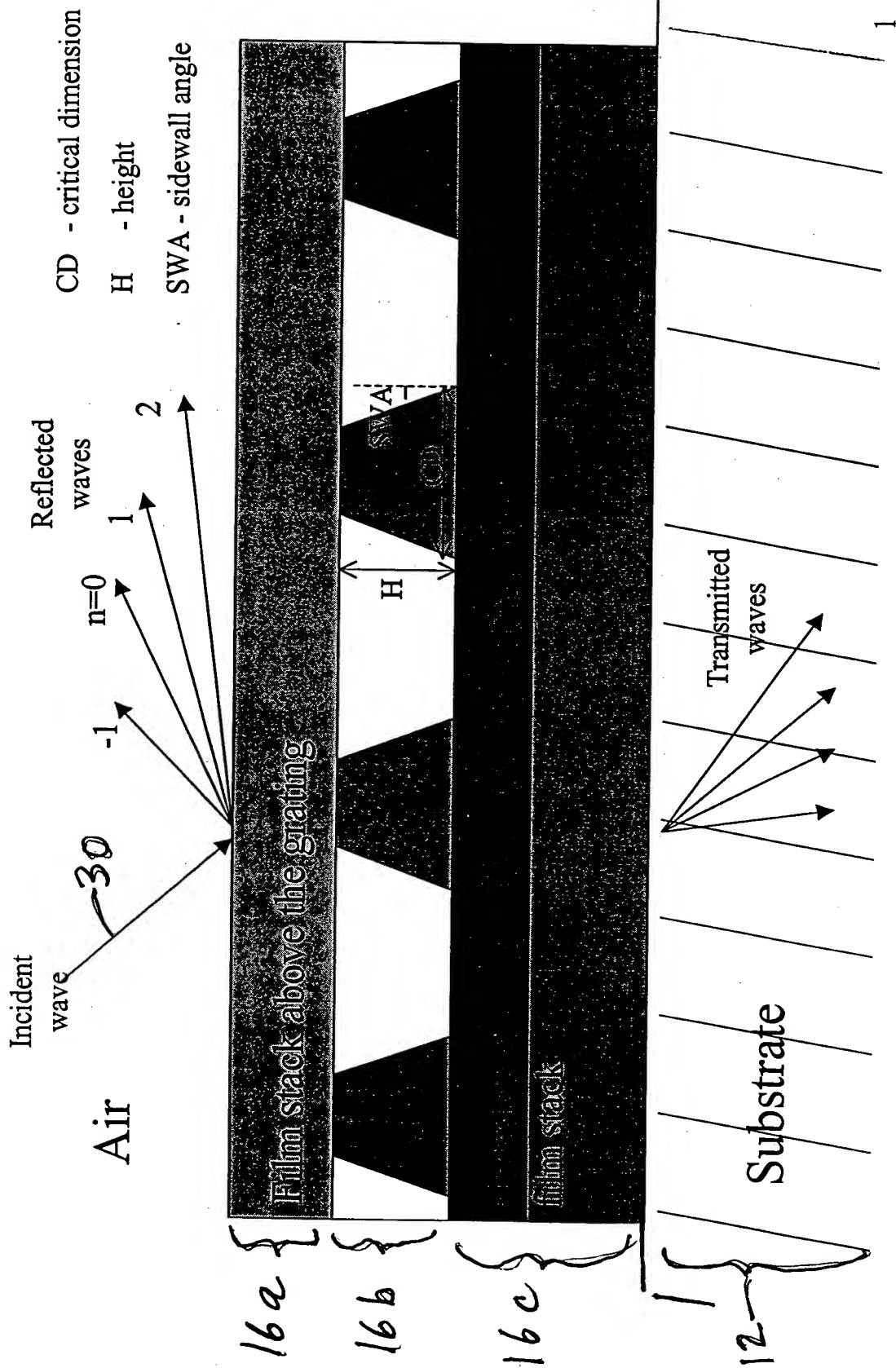


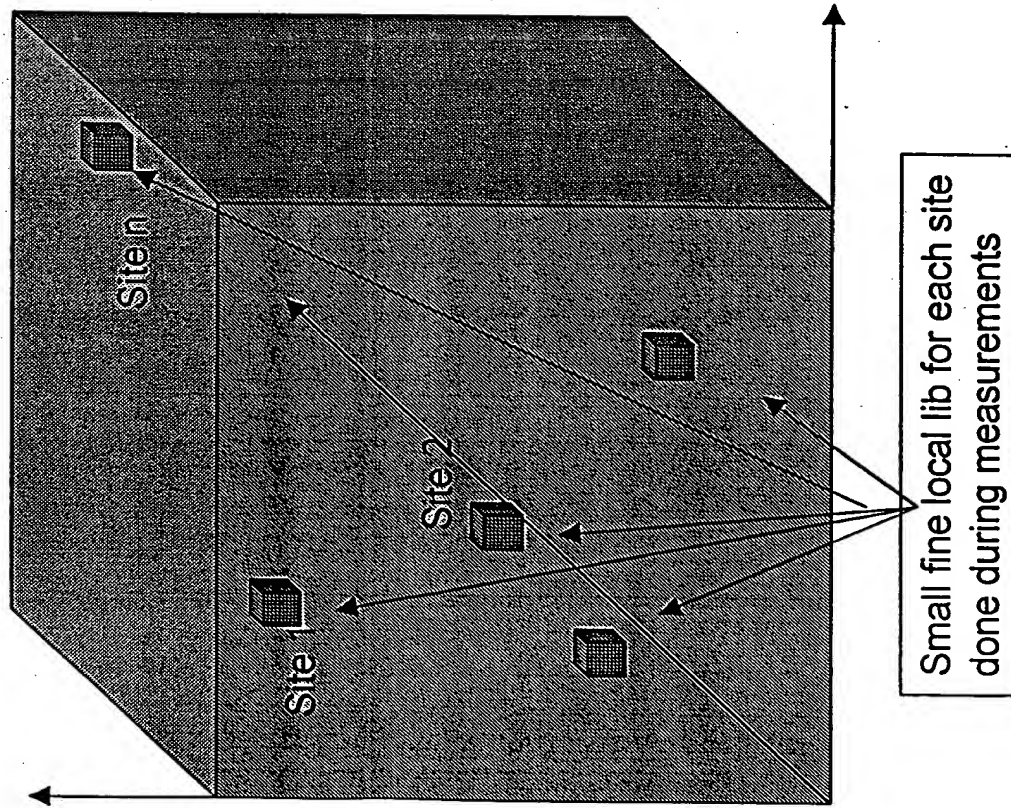
Fig. 1B

The diagram illustrates a system for determining the structure of a surface using diffraction. The process involves the following components and steps:

- Incident Beam (10):** A horizontal beam entering from the left.
- Surface (14):** A grating structure at the bottom.
- Diffracted Beam (60):** A beam reflected upwards from the surface.
- Lens (104):** A lens focusing the diffracted beam.
- Detector (62):** A detector receiving the focused beam.
- Measured Data (106):** A plot of intensity R versus wavelength λ obtained from the detector.
- Coarse Library of Spectra (102):** A collection of four reference spectra:
 - CD_1, H_1
 - CD_2, H_1
 - CD_1, H_2
 - CD_2, H_2
- Fit (108):** A block that compares the measured data with the library spectra. It outputs a "good fit" or a "bad fit".
- Nonlinear regression (110):** A block that receives "bad fit" feedback and provides "re-" (refinement) input to the Fit block.
- Diffraction model (112):** A block that receives input from the Nonlinear regression and provides input to the Coarse Library of Spectra.
- Parameters (114):** A box containing the output parameters: "Parameters: CD, H, SWA, etc."

FIG. 2

Adaptive library generation: Minimize unused library grids for maximum efficiency



Large coarse Lib to cover whole range
Done before measurements

Fig. 3

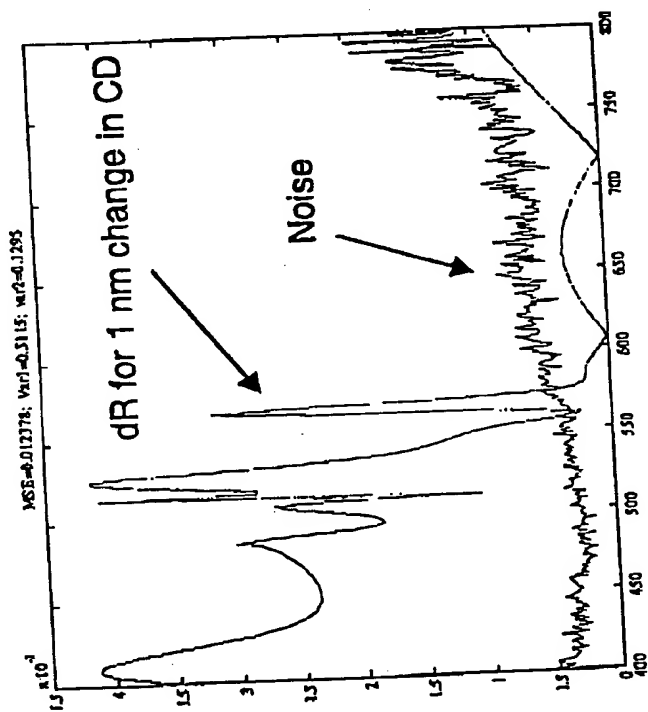


FIG. 4

002260 54472960

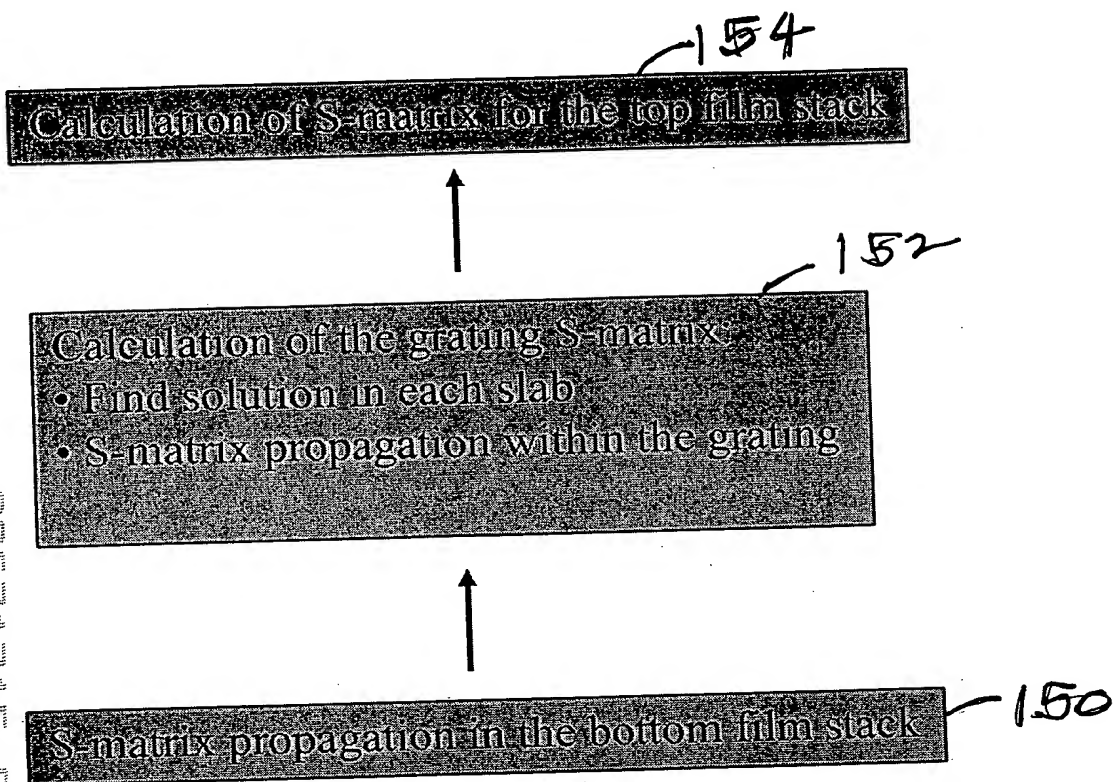
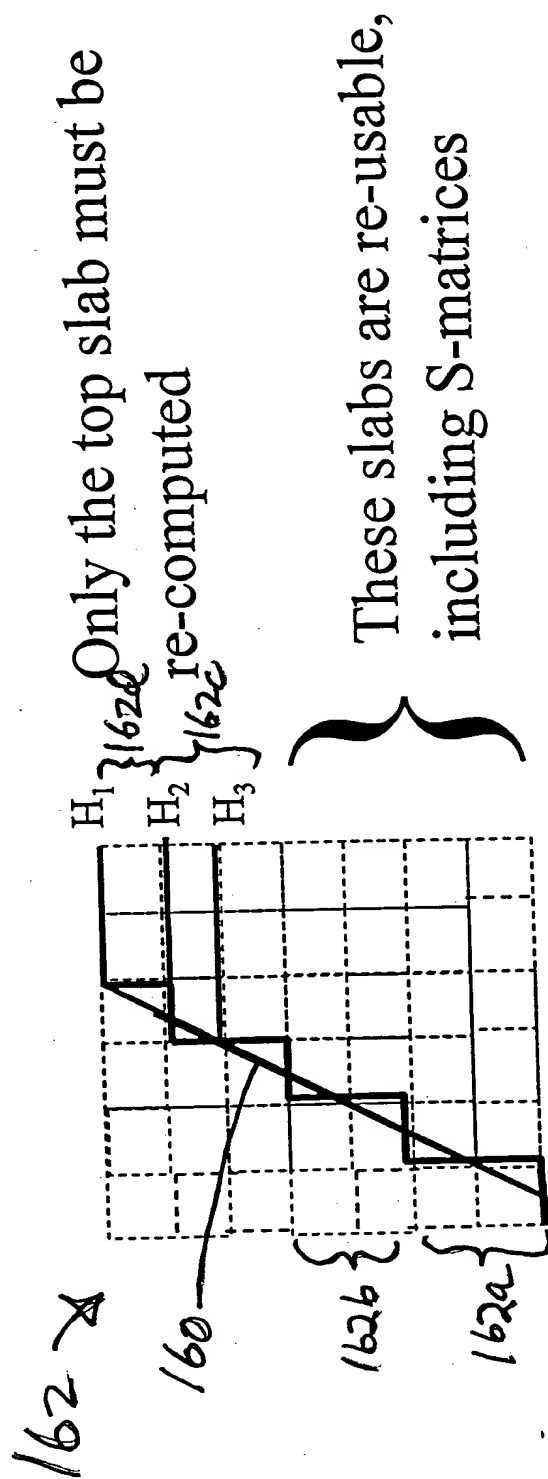


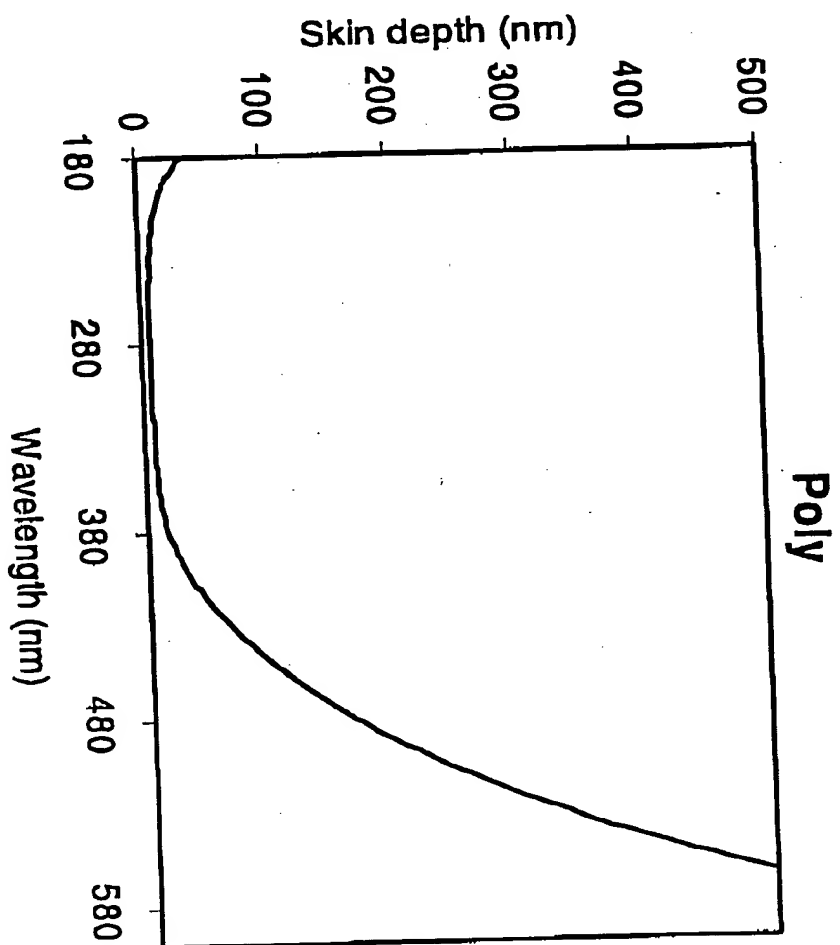
FIG. 5

2. Re-use of grating internal S-matrices

S-matrix is saved after processing most of the slabs



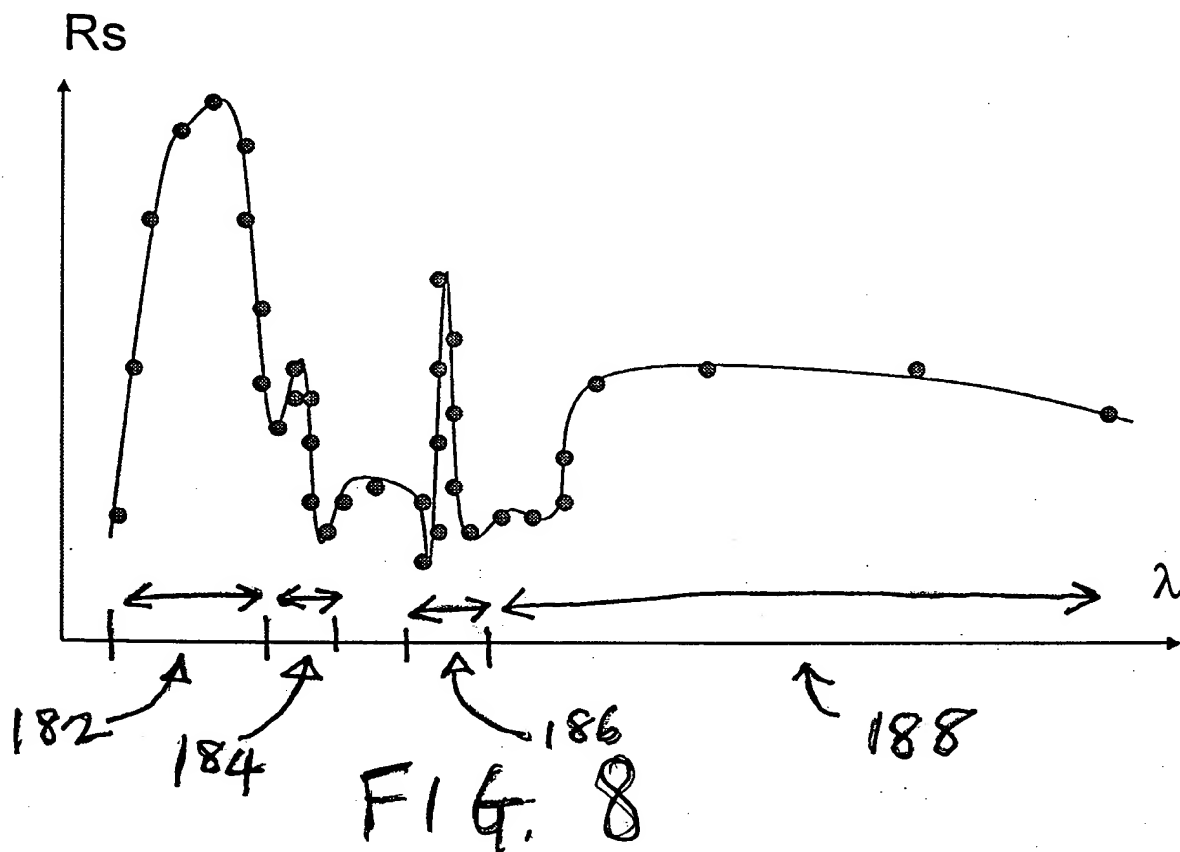
F1 to 6



F16.7

0327413-092700

002200 91112500



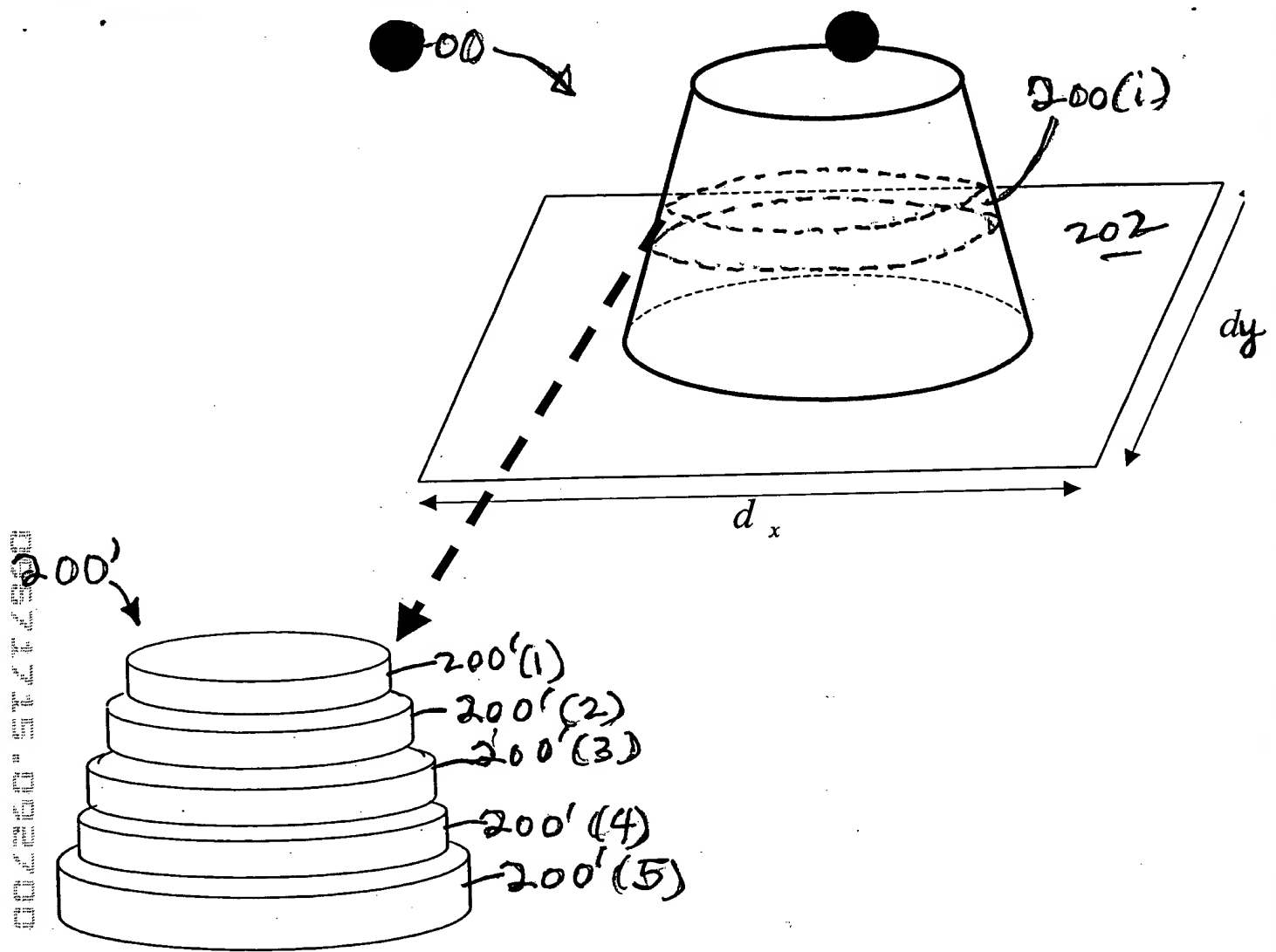
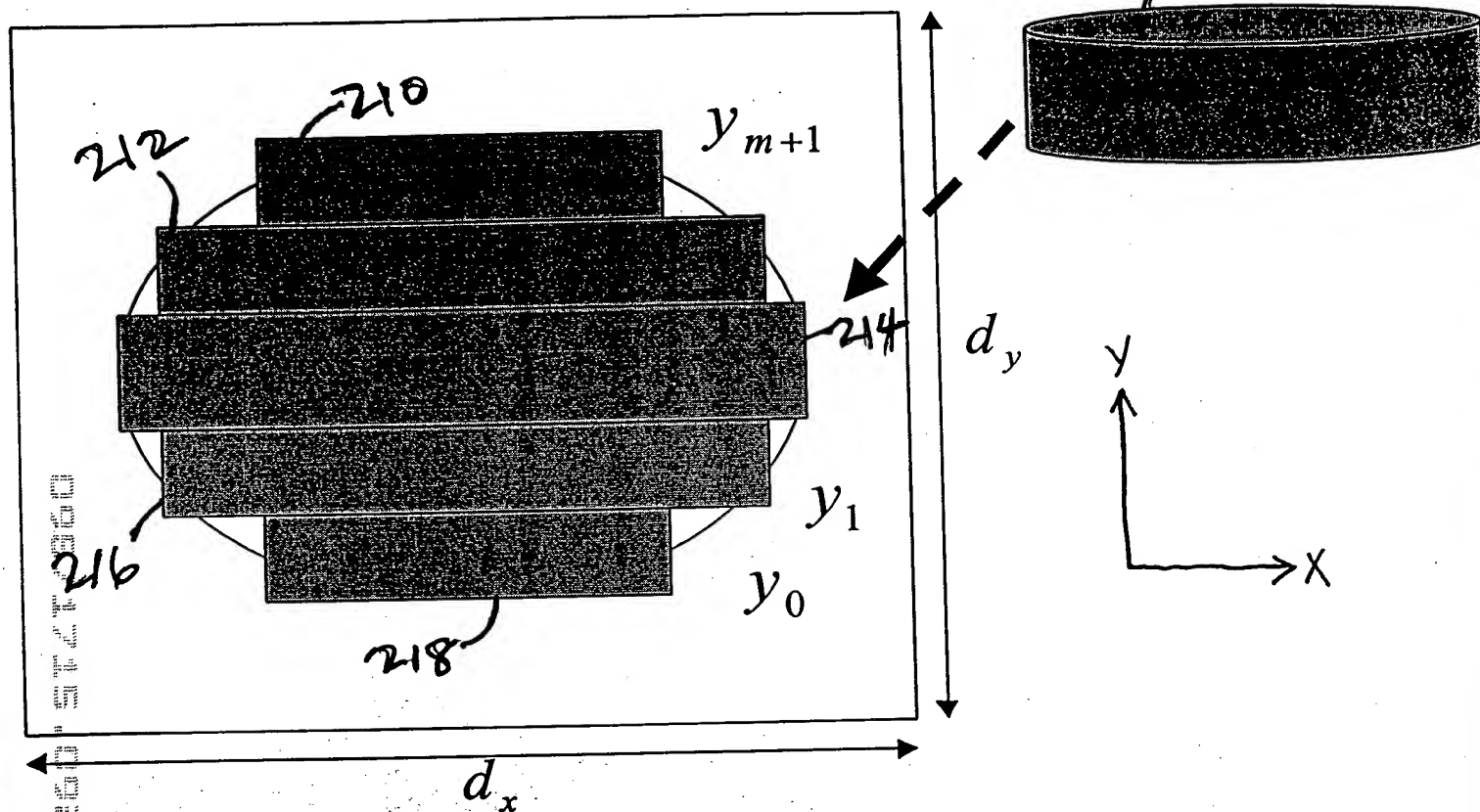


FIG. 9

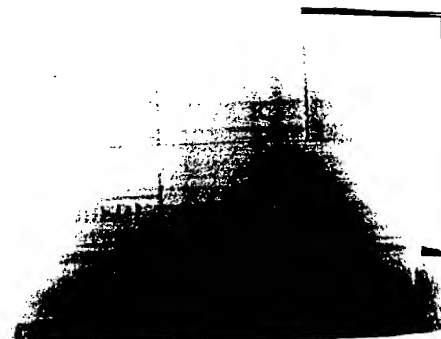
Fig. 2.



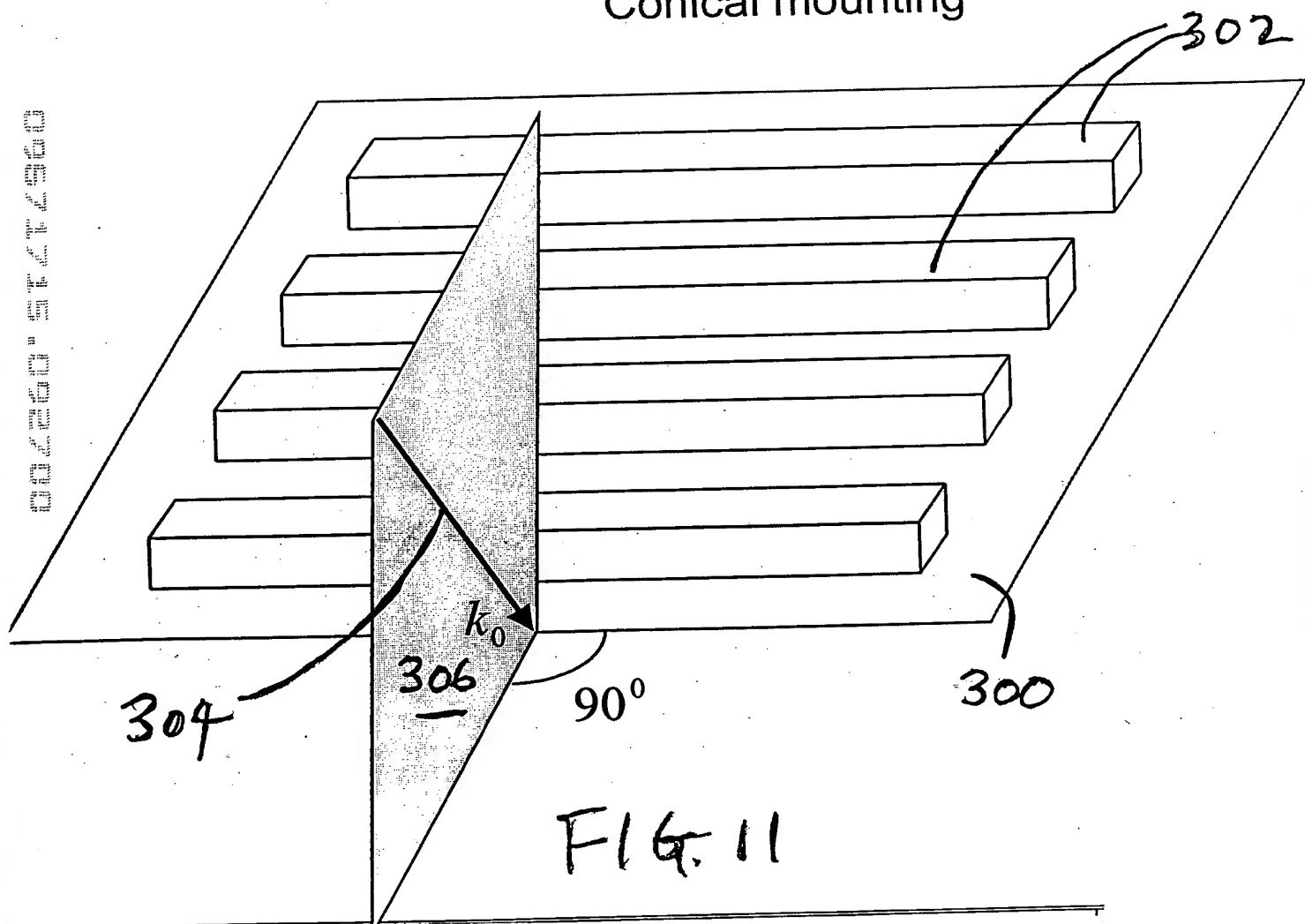
Pseudo-periodic boundary conditions in y-direction:

$$E(x, y_{m+1}) = E(x, y_0) e^{ik_0 y d_y}$$

FIG. 10



Conical mounting



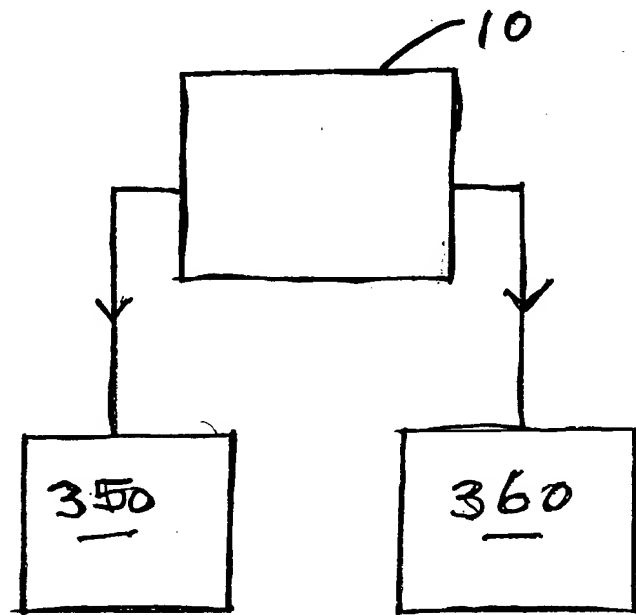


FIG. 12

004000 004000

002260" 5122360

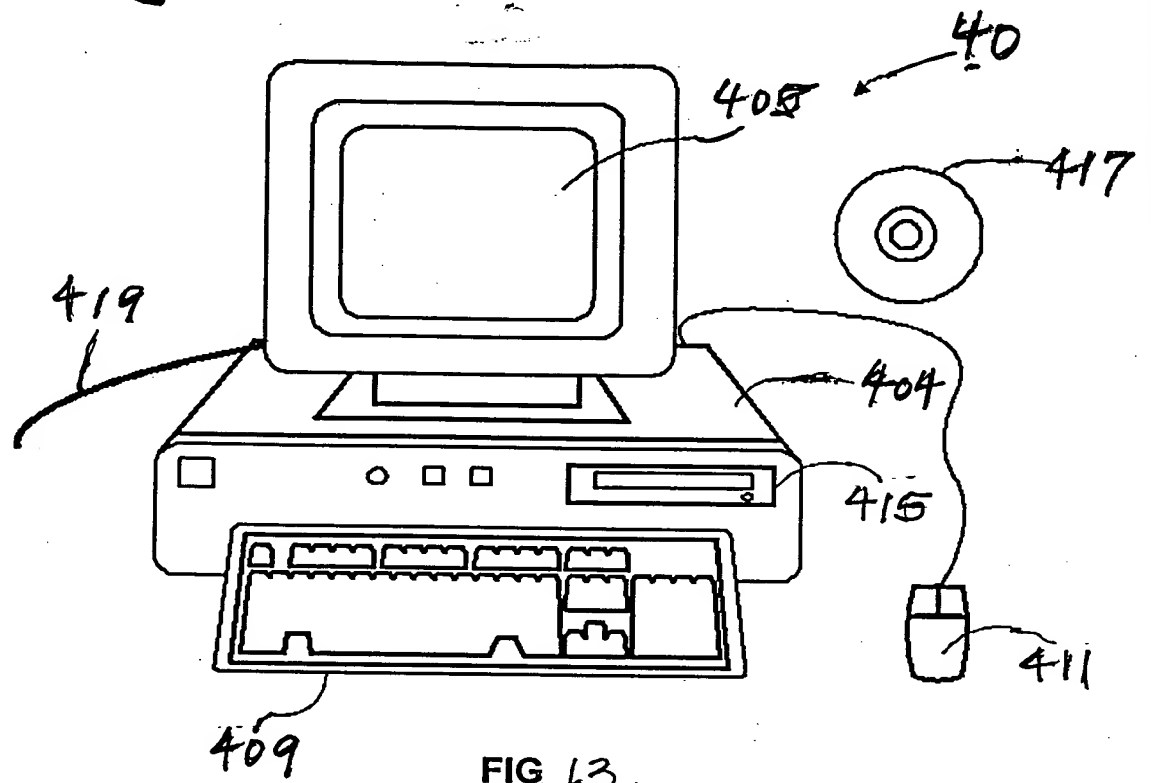


FIG 13.